

WHAT IS CLAIMED IS:

1. A brush unit manufacturing method for manufacturing a sheet-like brush unit, which is overlaid in plurality to form a rotary brush, comprising the steps of:

projecting, by a specified amount, a wire group formed by assembling together a plurality of wires in a bundle outward through an insert hole provided in a pedestal;

inserting a cone into the center of the projected end of the wire group to push open the wire group in radial directions; and

welding a center portion of the wire group in an annular shape with the pushed-open wire group being fixed to the pedestal and cutting the inner side of the annular welded part;

to form a sheet-like brush unit having a hub at the center thereof and having a plurality of bristles (wires) projecting radially from the hub.

2. A rotary brush manufacturing method comprising the steps of:

projecting, by a specified amount, a wire group formed by assembling together a plurality of wires in a bundle outward through an insert hole provided in a pedestal;

inserting a cone into the center of the projected end of the wire group to push open the wire group in radial directions;

welding a center portion of the wire group in an annular shape with the pushed-open wire group being fixed to the pedestal; and

cutting the inner side of the annular welded part to form a sheet-like brush unit having a hub at the center thereof and having a plurality of bristles (wires) projecting radially from the hub;

making a core pipe be inserted in and hold the hub of the brush unit;

taking out the brush unit, together with the core pipe, to the exterior of the pedestal; and

repeating these steps to make a plurality of brush units be held insertingly in the core pipe, thereby forming a roll-like rotary brush having a plurality of bristles projecting radially.

3. The rotary brush manufacturing method according to Claim 2, wherein the tips of the bristles of the rotary brush are trimmed to uniform length and subject to a finishing treatment.

4. A device for manufacturing a brush unit for rotary brush, comprising:

a pedestal having an insert hole through which a wire group formed by assembling together a plurality of wires in a bundle is to be passed;

a chuck for grasping the wire group and holding the wire group so that it projects outward from the insert hole of the pedestal by a specified amount;

a cone to be inserted into the center of the projected end of the wire group to push open the wire group in radial directions;

a pressing member for fixing the pushed-open wire group to the pedestal;

a welder for welding a center portion of the wire group in an annular shape with the wire group being fixed to the pedestal; and

a cutting machine for cutting the inner side of the welded part of the wire group.

5. A rotary brush manufacturing device comprising:

a pedestal having an insert hole through which a wire group formed by assembling together a plurality of wires in a bundle is to be passed;

a chuck for grasping the wire group and holding the wire group so that it projects outward from the insert hole of the pedestal by a specified amount;

a cone to be inserted into the center of the projected end of the wire group to push open the wire group in radial directions;

a pressing member for fixing the pushed-open wire group to the pedestal;

a welder for welding a center portion of the wire group in an annular shape with the wire group being fixed to the pedestal;

a cutting machine for cutting the inner side of the wire group while leaving the welded part to form a sheet-like brush unit having a hub at the center thereof and having a plurality of bristles (wires) projecting in outwardly radial directions from the hub; and

a pipe handling machine for making a core pipe be inserted in and hold the hub of the brush unit and taking out the brush unit, together with the core pipe, to the exterior of the pedestal.

6. The rotary brush manufacturing device according to Claim 5, further comprising: a cutter for cutting the bristles of the rotary brush to uniform length while rotating the rotary brush; and a finishing machine, which rounds the tips of the bristles.

7. A sheet-like brush unit for roll toothbrush, which is overlaid in plurality to form a rotary toothbrush and wherein

a wire group is formed by assembling together a plurality of wires in a bundle and pushing open the wires in radial

directions,

a center portion of the wire group being welded in annular shape with the pushed-open wire group being fixed to a pedestal to form a welded part and the inner periphery of the annular welded part being cut in circular form to form a circular insert hole.

8. A rotary brush for roll toothbrush, wherein sheet-like brush units for roll toothbrush are formed respectively by forming a wire group by assembling together a plurality of wires in a bundle and pushing open the wires in radial directions,

welding a center portion of the wire group in annular shape with the pushed-open wire group being fixed to a pedestal to form a welded part, and cutting the inner periphery of the annular welded part in circular form to form a circular insert hole,

said sheet-like brush units are overlaid in plurality, and

a core pipe is inserted into the insert hole.

9. A roll toothbrush, wherein sheet-like brush units for roll toothbrush are formed respectively by forming a wire group by assembling together a plurality of wires in a bundle and pushing open the wires in radial directions,

welding a center portion of the wire group in annular shape with the pushed-open wire group being fixed to a pedestal to form a welded part, and cutting the inner periphery of the annular welded part in circular form to form a circular insert hole,

a rotary brush is formed by overlaying said sheet-like brush units in plurality and

inserting a core pipe into the insert hole, and

the rotary brush is supported in a rotatable manner in a handle member.

10. A roll toothbrush manufacturing method comprising the steps of:

projecting, by a specified amount, a wire group formed by assembling together a plurality of wires in a bundle outward through an insert hole provided in a pedestal;

inserting a cone into the center of the projected end of the wire group to push open the wire group in radial directions;

welding a center portion of the wire group in an annular shape with the pushed-open wire group fixed to the pedestal;

cutting the inner side of the annular welded part to form a sheet-like brush unit having a hub at the center thereof and having a plurality of bristles (wires) projecting radially from the hub;

making a core pipe be inserted in and hold the hub of the brush unit;

taking out the brush unit, together with the core pipe, to the exterior of the pedestal;

repeating these steps to make the core pipe insertingly hold a plurality of the brush units, thereby forming a roll-like rotary brush with a plurality of bristles projecting radially; and

making the rotary brush be supported in a rotatable manner in a handle member.

11. A method for manufacturing a rotary toothbrush, wherein a rotary brush, which is in turn formed by overlaying a plurality of brush units, is mounted in a rotatable manner to a handle member, comprising the steps of:

projecting, by a specified amount, a wire group formed by assembling together a plurality of wires in a bundle outward through an insert hole provided in a pedestal; blowing air into the center of the projected end of the wire group to open up the wire group in radial directions; welding a center portion of the wire group with the opened-up wire group being fixed to the pedestal; cutting a central part of the welded center portion to form a brush unit; and concentrically overlaying the brush units in plurality to form a rotary brush; and

thereafter mounting the rotary brush to a handle member.

12. A method for manufacturing a brush unit for rotary brush, which is overlaid in plurality to form a rotary brush, comprising:

a first step of projecting, by a specified amount, a wire group formed by assembling together a plurality of wires in a bundle outward through an insert hole provided in a pedestal;

a second step of blowing air into the center of the projected side of the wire group to push open the wire group in radial directions;

a third step of welding a center portion of the wire group with the opened wire group being fixed to the pedestal; and

a fourth step of cutting off a central part of the welded center portion.

13. A device for manufacturing a brush unit for rotary brush, which is overlaid in plurality to form a rotary brush, comprising:

a pedestal having an insert hole through which a wire group formed by assembling together a plurality of wires in a bundle is to be passed;

a chuck for grasping the wire group and holding the wire group so that it projects from the insert hole of the pedestal by a specified amount;



a nozzle for blowing air into the center of the projected end of the wire group to open up the wire group in radial directions;

a pressing member for fixing the opened-up wire group to the pedestal;

a welder for welding a center portion of the wire group with the wire group fixed to the pedestal; and

a cut-off means for cutting off a central part of the welded part welded by the welder.

14. The brush unit manufacturing device for rotary brush according to Claim 13, wherein said chuck is formed of a casing and a cylindrical resilient member positioned in the interior of the casing, and arranged so that the resilient member is expanded or compressed by the supplying or discharge of air into or out from the interior of the casing to grasp or release the wire group that has been inserted into the interior.

15. The brush unit manufacturing device for rotary brush unit according to Claim 13, wherein said nozzle is provided in the interior thereof with an air passage for blowing air into the central part of the projected end of the wire group and has said cut-off means formed on the tip thereof.

16. The brush unit manufacturing device for rotary brush unit according to Claim 13, wherein said nozzle and welder are

mounted on a single frame and arranged to be moved in the left/right and up/down directions via this frame.

17. The brush unit manufacturing device for rotary brush unit according to Claim 13, wherein a slide blade for cutting and removing the remaining welded part of the wire group that has been cut by the cut-off means is mounted to said pedestal, and this slide blade is provided with an inclining face for applying a force in the direction in which the remaining welded part of the wire group is extracted from the pedestal.